CONTENTS

ANSI/ASHRAE/IES Standard 90.2-2024
High-Performance Energy Design of Residential Buildings

SECTION	PAGE
Foreword	
1 Purpose	2
2 Scope	3
3 Terminology	3
4 Administration and Enforcement	8
5 Additions and Alterations	9
6 Performance Requirements	12
7 Requirements	14
8 Verification	23
9 Reporting Requirements	25
10 Normative References	27
Normative Appendix A: Software Requirements	29
Normative Appendix B: Modeling Rule Set	31
Normative Appendix C: Air Leakage Testing	33
Normative Appendix D: Installation Requirements	34
Informative Appendix E: Procedures for Generating Prescriptive Paths	35
Informative Appendix F: Ducts in Conditioned Space	39
Informative Appendix G: Step-By-Step Approach for Calculating Lighting Energy Using the Performance Path	43
Informative Appendix H: Plan Review Inspection Checklist	44
Informative Appendix I: Site Inspection Checklist	45
Informative Appendix J: Framing Factors	47
Informative Appendix K: Net Zero Appendix	48
Informative Appendix L: Informative References	49
Informative Appendix M: Addenda Description	50

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This 2024 revision of ANSI/ASHRAE/IES Standard 90.2 reflects an ongoing commitment to achieving high energy performance buildings. In addition to providing leadership in energy efficiency, this standard enables progress toward decarbonization goals.

Updates to the 2024 edition include the following:

- *New Title, Purpose, and Scope*
  - *The new title clarifies that Standard 90.2 addresses not only energy efficiency but also energy performance, which includes considerations such as emissions and indoor environmental quality (IEQ).*
  - *Under the new scope, the standard now covers multifamily residential buildings of any height; the reference to "three stories or less" has been removed.*
- *New performance requirements for substantial energy alterations (retrofits) in Section 5.3*
- *Changes throughout the standard to clarify the differences between dwelling units and common areas, and their respective requirements*
  - *New lighting control requirements for common areas distinct from dwelling units*
  - *New thermal envelope requirements to specifically address common areas*
- *Changes to Section 6 to extend energy efficiency requirements and implement new CO_2e targets for operational emissions. These requirements reduce net building energy consumption by about half, compared to Standard 90.2-2018, as a steppingstone to net zero energy and net zero carbon emissions design and operation.*
  - *New limits for the maximum Energy Rating Index (ERI) and CO_2e Rating Index (CRI) consistent with the most ambitious recommendations of national and international organizations*
  - *Thresholds for the ERI and CRI (not counting renewable energy) when renewable energy systems are utilized on- or off-site to ensure that the use of renewable energy does not compromise efficiency*
  - *A new Informative Appendix K for jurisdictions wanting to enforce net zero energy and zero carbon requirements*
- *Increases in stringency for air leakage requirements and updates to Normative Appendix C to accommodate different test methods as appropriate*
- *Expansion of indoor environmental quality requirements in Section 7.3 to create greater alignment with ASHRAE Standard 62.2, with additional provisions to address air cleaning, garages, material emissions, radon, and kitchen exhaust hoods*
  - *This revision is intended to promote the harmonization of energy efficiency and IEQ requirements.*
  - *Sections 7.3.4 through 7.3.6 examine common residential design elements where IEQ is a relevant issue and how they can be addressed by balancing health concerns and energy consumption concerns.*
  - *In a future update to this standard, an effort will be made to affirmatively state that "energy performance," as referenced in the purpose and scope of the standard, includes IEQ.*
- *Various changes to Section 7 lighting requirements*
  - *In Section 7.3, improvements to lighting quality with the use of dim-to-warm and tunable light sources*
  - *In Section 7.5, higher-efficacy requirements for permanent lighting and more detailed requirements for lighting controls in common areas*
- *New requirements for the provision of charging infrastructure for electric vehicles (EVs) in Section 7*
  - *Standard 90.2 compliance now requires every parking space to have EV supply equipment installed or be equipped with the electrical connections of an EV-ready space for future installation.*
  - *These requirements anticipate future development of algorithms that offer carbon credit for optimized charging and discharging of EV batteries.*

1. PURPOSE

The purpose of this standard is to establish whole-building design requirements that enable high levels of *energy performance* and *greenhouse gas emission performance* for *residential buildings*.

2. SCOPE

This standard provides requirements for achieving high levels of *energy performance* and *greenhouse gas emission performance* of *residential buildings* and their systems.

2.1 Buildings and Portions of Buildings Covered

a. *Dwelling units* in which the occupants are nontransient
b. *Common areas* associated with residential occupancies
c. *Outbuildings* associated with residential occupancies

2.2 Systems Covered

a. *Building* envelope
b. HVAC and mechanical systems
c. Service hot-water systems
d. Major appliances
e. Interior and exterior lighting systems
f. Snow and ice melt systems
g. Pools and *spas*
h. Renewable energy systems
i. Energy storage systems
j. Connected *controls*

2.3 Exemptions. This standard does not apply to transient housing, such as hotels, motels, nursing homes, jails, dormitories, and barracks.

2.4 Health, Safety, and Welfare. This standard shall not be used to abridge any safety, health, or environmental requirements.

3. TERMINOLOGY

Certain definitions, abbreviations, and acronyms are listed in this section for the purposes of this standard. These are applicable to all sections of this standard. Terminology that is not defined shall have its ordinarily accepted meaning within the context in which it is used. Ordinarily accepted meanings shall be based on American standard English language usage as documented in an unabridged dictionary accepted by the *authority having jurisdiction* (*AHJ*).

3.1 Definitions

addition: an extension or increase in the floor area or height of a *building* outside of the existing *building* envelope.

air barrier: one or more materials joined together in a continuous manner to restrict or prevent the passage of air through the *building* envelope and *air assemblies*.

alteration: a replacement or addition to a *building* or its systems and equipment; routine maintenance, repair, and service, or a change in the *building*'s use classification or category shall not constitute an *alteration.*

assembly: portion of an *envelope component* represented by an arrangement and connection of *building* construction materials with a specific thermal transmittance or thermal conductance.

attached dwelling unit: a *dwelling unit* sharing demising walls, floors, ceilings or common corridors with another *dwelling unit* or occupiable *space*.

authority having jurisdiction (AHJ): the agency or agent responsible for enforcing this standard.

automatic control device: a device capable of automatically turning loads off or on without manual intervention.

automatic shutoff control: a device capable of automatically turning loads off without manual intervention. *Automatic shutoff controls* include devices including (but not limited to) *occupancy sensors*, *vacancy sensors*, door switches, programmable time switches (i.e., timeclock), or count-down timers.

automobile parking space: a *space* within a *building* or private or public *parking lot*, exclusive of driveways, ramps, columns, and office and work areas, for the parking of an automobile.

ballast: a device used in conjunction with an electric-discharge *lamp* to cause the *lamp* to start, control, and operate under the proper circuit conditions of voltage, current, wave form, or electrode heat.

bedrooms: a room or *space* 70 ft^2 (6.5 m^2) of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A den, library, or home office with a closet, egress window, and 70 ft^2 (6.5 m^2) of floor area or greater shall count as a *bedroom*, but living rooms and foyers shall not.